5M-Aug., 1938.

ONTARIO

Department of Education

Courses of Study

Middle and Upper School

and

Examinations

of the

HIGH SCHOOLS, COLLEGIATE INSTITUTES AND CONTINUATION SCHOOLS

Reprinted from

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SUBJECTS OF STUDY

Middle School Subjects

(A Two Years' Course)

(1) The following subjects are obligatory on each pupil in each year of the Middle School:

English (Literature, Composition).
Physical Education.

(2) The following subjects are optional:

(a) Algebra.
Geometry.
Physics.
Chemistry.
Agriculture and Horticulture, I.
Agriculture and Horticulture, II.
Canadian History.
Ancient History.

(b) Latin.
Greek.
French.
German.
Spanish.
Italian.

(c) Manual Training.
Household Science.
Art.
Music.
Bookkeeping and Penmanship.
Stenography and Typewriting.
Additional subjects recommended by the local authorities and approved by the Minister.

Note.—With the exception of the foreign languages, each of the Middle School subjects provides a one-year course.

Upper School Subjects

(1) The following subject is obligatory on each pupil in the Upper School:

Physical Education.

(2) The following subjects are optional:

English (Literature, Composition).
Algebra.
Geometry.
Trigonometry.

Modern World History.
Physics.
Chemistry.
Botany.
Zoology.
Latin.
Greek.
French.
German.
Spanish.
Italian.

Additional subjects recommended by the local authorities and approved by the Minister.

Limitations

(1) None of the Upper School courses may be taken up in a High School with a staff of only two regular teachers.

(2) Except with the approval of the Minister, obtained beforehand, none of the Upper School courses may be taken up in any Continuation School, or in a High School with a staff of only three teachers. As the Minister's approval applies only to the school year for which it is granted, it must be obtained every year.

(3) (a) The courses in Manual Training, Household Science, and Agriculture and Horticulture may be taken up in any school when provision satisfactory to the Minister has been made therefor on the joint report of the High School Inspector and the special Inspector or Director concerned.

(b) Due notice of the proposed establishment of any of the courses mentioned in (3) (a) above shall be sent to the Minister. Unless such notice is sent and the courses are approved by the Minister, their establishment is not authorized.

Instruction to be Provided

(1) It shall be the duty of the Board of every High School to provide instruction in the obligatory subjects of study, and in such of the optional subjects as they may select on the recommendation of the Principal.

(2) It shall be lawful for School Boards to establish and maintain part-time High School courses of instruction for the education of adolescents who are required to take such courses by the provisions of the Adolescent School Attendance Act.

(3) On the recommendation of the Principal, a Board may direct that one or more subjects of the Upper School course be taken up in the second year of the Middle School course.

In any High or Continuation School District where Fifth Forms have been established in one or more of the Public or Separate Schools, the Board of Education, the Collegiate Institute Board, the High School Board, or the Continuation School Board, as the case may be, may omit a part or all of the

Lower School courses in one or more of its schools, and may direct that the pupils of any area within the High or Continuation School District shall take the Fifth Form courses, in whole or in part, in the Public and Separate Schools within the High or Continuation School District where provision is made for such courses.

Selection of Subjects

(1) In each of the two years of the Lower School course, every pupil shall take, in addition to the obligatory subjects, not fewer than two or more than five of the optional subjects.

(2) In each of the two years of the Middle School course, every pupil shall take, in addition to the obligatory subjects, not fewer than four or more than seven of the optional subjects.

(3) A pupil who passes the examination in English in the first year of the Middle School shall in the second year take the English either of the Middle School course or of the Upper School course, as the Principal may direct.

(4) A pupil in the Upper School may take such subjects of the Upper School course as may be approved by the Principal.

(5) No pupil shall be exempted from the course in Physical Education except upon a medical certificate, or on account of evident physical disability.

(6) On application in writing by a parent or guardian the Principal with the approval of the Minister may in a special case allow a modification in the selection of the Lower School subjects.

In determining the maximum number of subjects to be taken by any pupil:

(1) Manual Training, Household Science, and Music shall not be counted.

(2) Each of the foreign languages of the Middle School course shall count as two subjects where the two-year course is being covered in one year.

(3) Where Middle School pupils in the second year of the Middle School course take one or more Upper School subjects, each subject so taken shall count as a Middle School subject.

MIDDLE SCHOOL SUBJECTS

ENGLISH COMPOSITION

The Course of the Lower School in oral and written composition continued and extended, with greater attention to the development of literary style.

The elements of Narration, Description, Exposition, and Argumentation.

The study of models of prose-writing and the memorization of two or three good models.

The planning of compositions and the writing of compositions from plans.

Notes:

(1) On returning a set of compositions to the writers, the teacher should discuss the merits and demerits of the pupils' work and give helpful criticism.

(2) Good composition in all written work and clear comprehensive answers in all oral work should be demanded by every teacher. The dictation of notes and the writing of translations should be avoided.

(3) The Debating and the Literary Society should supplement the work in this subject; but constant practice in writing is the basis of all progress in composition.

(4) The question paper in English Composition will test the candidate's ability:

(a) to write a short essay from a carefully selected list of topics which should require not more than an hour or an hour and a half to write;

(b) to construct sentences and to use words correctly in one or more of the following ways:

(i) by explaining the meaning of phrases and longer statements in a given passage;

(ii) by correcting sentences that are faulty in grammar or syntax and by explaining the reasons for these corrections;

(iii) by defining words and by showing how to use them correctly in sentences;

(iv) by writing a short letter in correct form.

At least 60 per cent of the marks assigned to the whole question paper will be allotted to question 1 (the essay).

ENGLISH LITERATURE

Intelligent and appreciative study of suitable authors, both prose and poetry, including those prescribed for the Departmental and University Matriculation Examinations.

Systematic oral reading by the pupils of the texts studied in the class.

Supplementary reading provided by the pupils themselves or supplied from the school, public, or other library.

Memorization and recitation of choice selections in prose and poetry prescribed by the Department and of others made by the teacher.

Note.—At this stage the pupils begin to appreciate literature as such. Besides supplementary reading of the same character as that taken up in the Lower School, other works of a subjective character may be added. The purpose and the spirit of the author and the merits of his thoughts and style should now be dealt with in a general way; his defects should not be emphasized. The chief object is still the cultivation of a taste for good literature, and the authors should be read partly in class and partly at home both silently and aloud.

CANADIAN HISTORY

The history of Canada as outlined in the *History of the Canadian People*. This will include the chapter on the Government of Canada.

The course in the history of Canada will include also the geography relating to the history prescribed.

The following books of reference will be found useful:

Chronicles of Canada—Glasgow, Brook & Co.
The Makers of Canada—MacLean Publishing Company.
Works of Francis Parkman—Little, Brown & Company.
History of Canada, Duncan McArthur—W. J. Gage & Company, Ltd.
High School History of Canada, W. L. Grant—The Ryerson Press.
The Story of Canada, G. M. Wrong, Chester Martin, Walter N. Sage—The Ryerson Press.

ANCIENT HISTORY

The history of Greece and of Rome as outlined in the *Ancient History* (Revised Edition), authorized by the Department of Education of Ontario. This will include chapters I-XXII inclusive on The Orient and Greece, and chapters I-XXIII inclusive on the History of Rome.

The course in Ancient History will include also the geography relating to the history prescribed.

Books of Reference

The following books will be found useful for supplementary reading on the topics of the course, and should be placed in every High School library:

Breasted, Ancient Times, Ginn & Co.

Botsford, A History of Greece, The Macmillan Company, Ltd.

Pelham, Outlines of Roman History, G. P. Putnam's Sons.

Havell, Republican Rome, Ballantyne Press.

Cotterill, Ancient Greece, Ballantyne Press.

Botsford, A Source Book of Ancient History, The Macmillan Company, Ltd.

Munro, A Source Book of Roman History, Heath & Co.

Fling, A Source Book of Greek History, Heath & Co.

Translations of the Histories of Herodotus, Thucydides, Polybius, and Livy.

Ginn's Classical Atlas, Ginn & Co.

The Story of Greece and Rome, by J. C. and H. G. Robertson, The Macmillan Company, Ltd.

Wolfson, Essentials in Ancient History, American Book Company.

ALGEBRA

Lower School course reviewed and extended; fractions and fractional equations; extraction of roots; simple graphs; simple ratio and proportion; indices, surds and surd equations; quadratics of one and two unknowns, with solutions of problems; theory of quadratics.

The course is covered in the Ontario High School Algebra. The following, however, may be omitted: Articles 228, 229, 230, 242, 243, and Chapter XXVI.

GEOMETRY

A selection of the leading propositions in Elementary Geometry, with exercises thereon.

The topics of the course are as follows:

Lower School course reviewed and extended.

If two equal triangles are on the same side of a common base, the straight line joining their vertices is parallel to the common base.

The complements of the parallelograms about the diagonal of any parallelogram are equal to each other.

Construct a parallelogram equal in area to a given triangle and having one of its angles equal to a given angle.

Construct a triangle equal in area to a given quadrilateral.

Construct a triangle equal in area to a given rectilineal figure.

Describe a parallelogram equal to a given rectilineal figure and having an angle equal to a given angle.

Construct a triangle equal in area to a given triangle and having one of its sides equal to a given straight line.

On a straight line of given length make a parallelogram equal in area to a given triangle and having an angle equal to a given angle.

The square on the sum of two straight lines equals the sum of the squares on the two straight lines increased by twice the rectangle contained by the straight lines.

The square on the difference of two straight lines equals the sum of the squares on the two straight lines diminished by twice the rectangle contained by the straight lines.

The difference of the squares on two straight lines equals the rectangle of which the length is the sum of the straight lines and the breadth in the difference of the straight lines.

The square described on the hypotenuse of a right-angled triangle is equal to the sum of the squares on the other two sides, with converse.

In an obtuse-angled triangle, the square on the side opposite the obtuse angle equals the sum of the squares on the sides that contain the obtuse angle increased by twice the rectangle contained by either of these sides and the projection of the other side on it.

In any triangle, the square on the side opposite an acute angle is equal to the sum of the squares on the sides which contain the acute angle diminished by twice the rectangle contained by either of these sides and the projection of the other side on it.

If from a point within a circle more than two equal straight lines are drawn to the circumference, that point is the centre.

Find the centre of a given circle.

Circumscribe a circle about a given triangle.

If two chords are equally distant from the centre of a circle, the chords are equal to each other.

If a chord of a circle does not pass through the centre, the chord is less than a diameter.

Of two chords in a circle the one which is nearer to the centre is greater than the one which is more remote from the centre, with converse.

The angle which an arc of a circle subtends at the centre is double the angle which it subtends at any point on the remaining part of the circumference.

If angles are in the same segment of a circle, the angles are equal to each other.

If the straight line joining two points subtends equal angles at two other points on the same side of it, the four points are concyclic.

The angle in a semi-circle is a right angle.

The angle in a major segment of a circle is acute.

The angle in a minor segment of a circle is obtuse.

If a quadrilateral be inscribed in a circle, its opposite angles are supplementary, with converse.

If two angles at the centre of a circle are equal to each other, they are subtended by equal arcs.

The radius drawn to the point of contact of a tangent is perpendicular to the tangent.

Draw a tangent to a given circle from a given point without the circle.

If at one end of a chord of a circle a tangent be drawn, each angle between the chord and the tangent is equal to the angle in the segment on the other side of the chord.

On a given straight line construct a segment containing an angle equal to a given angle.

From a given circle cut off a segment containing an angle equal to a given angle.

In a given circle inscribe a triangle similar to a given triangle.

Find the locus of the centres of circles touching two given intersecting straight lines.

Inscribe a circle in a given triangle.

Draw an escribed circle of a given triangle.

Describe a circle to touch three given straight lines.

About a given circle circumscribe a triangle similar to a given triangle.

Inscribe a circle in a given regular polygon.

If two circles touch each other, the straight line joining their centres passes through the point of contact.

If triangles have equal altitudes, their areas are to one another as the bases of the triangles.

A straight line drawn parallel to the base of a triangle cuts the sides, or the sides produced, proportionally, with converse.

Divide a given straight line into any number of equal parts.

Find a fourth proportional to three given straight lines taken in a given order.

Divide a given straight line in a given ratio.

Divide a given straight line similarly to a given divided line.

If the vertical angle of a triangle be bisected by a straight line which cuts the base, the segments of the base are proportional to the other sides of the triangle, with converse.

The bisector of the exterior vertical angle of a triangle divides the base externally into segments that are proportional to the sides of the triangle, with converse.

If the angles of one triangle are respectively equal to the angles of another, the corresponding sides of the triangles are proportional, with converse.

If two triangles have one angle of one equal to one angle of the other and the sides about these angles proportional, the triangles are similar, the equal angles being opposite corresponding sides.

If two triangles have two sides of one proportional to two sides of the other,

and the angles opposite one pair of corresponding sides in the proportion equal, the angles opposite the other pair of corresponding sides in the proportion are either equal or supplementary.

The perpendicular from the right angle to the hypotenuse in a right-angled triangle divides the triangle into two triangles which are similar to each other and to the original triangle.

Find the mean proportional between two given straight lines.

If four straight lines are proportionals, the rectangle contained by the means is equal to the rectangle contained by the extremes.

If two rectangles are equal to each other, the length of one is to the length of the other as the breadth of the second is to the breadth of the first.

If two chords intersect within a circle, the rectangle contained by the segments of one is equal to the rectangle contained by the segments of the other, with converse.

If from a point without a circle a secant and a tangent are drawn, the square on the tangent is equal to the rectangle contained by the secant and the part of it without the circle, with converse.

The areas of similar triangles are proportional to the squares on corresponding sides.

To describe a polygon similar to a given polygon and with the corresponding sides in a given ratio.

Divide similar polygons into similar triangles.

The areas of similar polygons are proportional to the squares on corresponding sides.

If three straight lines are in continued proportion, the first is to the third as any polygon on the first is to the similar and similarly described polygon on the second.

Make a polygon similar to a given polygon and such that their areas are in a given ratio.

Make a figure equal to one given rectilineal figure and similar to another.

In equal circles, angles, whether at the centres or circumferences, are proportional to the arcs on which they stand.

PHYSICS

A course defined as follows with mathematical applications simple and direct in character.

Sound

Vibration and Wave Motion:

Experiments to illustrate vibratory motion of the pendulum, strings and plates; transverse and longitudinal vibrations of a brass rod; wave motion in water, a rope and coil spring.

Production, Transmission, Reflection and Velocity of Sound:

Experiments to show that sound originates in a vibrating body (tuning forks, violin strings) and that sound travels in wood, water, air, etc., but not in a vacuum; to show consonance and reflection of sound (echoes).

Methods of determining the velocity of sound in air.

Distinguishing Features of Sound:

Experiments on intensity, pitch and quality.

Experiments on the law of lengths and the law of tensions of vibrating strings, and simple problems on these two laws; the four laws of vibrating strings.

Experiments on resonance by use of organ pipes (or other tubes) and resonance jars. Determination of pitch and velocity by means of resonance. Sympathetic vibrations.

Experiments with vibrating strings, plates and organ pipes to illustrate nodes and loops.

Interference Phenomena:

Experiments on interference and the production of beats.

Heat

Nature and Sources of Heat:

Experiments to show that energy of motion (kinetic energy), chemical energy, electrical energy, and radiant energy may be converted into heat.

The sun as a source of heat.

Temperature:

Experiments to show—the expansion and contraction of solids, liquids and gases due to changes in temperature; the different rates of expansion of (1) solids; (2) liquids; the temperature at which the density of water is at a maximum.

Construction and graduation of Centigrade and Fahrenheit thermometers. Charles' law; absolute zero.

Quantity of Heat:

Quantity of heat as contrasted with temperature; heat unit (the calorie); specific heat.

Experiments to find the specific heat of a metal and of a liquid.

Change of State Due To Heat:

Fusion. Experiments to determine the heat of fusion of ice.

Vaporization. Experiments to determine—the heat of vaporization of water, the effect of pressure on the boiling point of water, the rates of evaporation of water and of ether; cooling by evaporation; dew point.

Transference of Heat:

Experiments to show—conduction and convection of heat, the absorption and the emission of heat by different surfaces.

Light

Nature and Sources of Light:

The transmission of light.

Experiments to show—that light travels in straight lines, the forming of an image through a pin hole, the forming of shadows; the methods of measuring the intensity of light by means of (1) the shadow, (2) the grease spot, (3) the diffusion photometer.

Reflection of Light:

Experiments to show,—the law of reflection, the formation and the position of images in plane and spherical mirrors.

Drawing images of objects in any position.

Refraction of Light:

Experiments to show refraction; to measure the index of refraction; to illustrate the first law of refraction; to show total reflection.

Relation between velocity of light and index of refraction.

Experiments: to show the converging and the diverging of light by means of lenses; to determine the focal length, conjugate foci, and the formation of images by lenses.

The drawing of images formed by lenses and the relation between the size of the image and the size of the object.

Optical Intruments:

Simple microscope, camera, and projection lantern.

Colour:

Experiments with prisms to show the decomposition of white light and the combining of coloured lights to form white light, and with Newton's disc to illustrate complementary colours.

Experiments to show the effect of the transmission, the reflection and the absorption of light in producing colours.

The rainbow.

Magnetism and Electricity

Magnetism:

Experiments to show—the laws of magnetic attraction and repulsion, magnetic lines of force, magnetic field, magnetism by induction, magnetization, magnetic permeability, terrestrial magnetism, inclination and declination of the magnetic needle, evidence that each particle of a magnetized body acts as a magnet.

Static Electricity:

Experiments to show—electrical attraction and repulsion, the two kinds of electrification, conductors and non-conductors, electrification by contact and by induction, the residence of electric charges on the surfaces of conductors, the distribution of an electric charge on a surface, the escape of electric charges from points (lightning rods).

Experiments with the gold leaf electroscope, the electrophorus electrical condenser and the Leyden jar.

Simple notions of electrical potential

Current Electricity:

Experiments to show the production of an electric current by using cells having plates of different kinds.

Methods of determining the presence and the direction of electric currents (the galvanoscope), the effect of polarization of plates.

The Leclanché, dry, and gravity cells.

Simple ideas of electromotive force, current strength and resistance.

Experiments on the electrolysis of water, electroplating, the measurement of current strength by the water and the copper voltameters.

The storage cell.

Experiments to show,—the magnetic effects of an electric current, the electro-magnet, the relation between the direction of the current and the polarity of an electromagnet, the magnetic field due to an electric current.

Construction and action of the D'Arsonval galvanometer, the electric bell, the telegraph key and sounder, the D.C. motor.

Experiments to show the transformation of electric energy into heat (the electric iron, the incandescent lamp).

Induced currents.

Experiments to show,—the production and direction of induced currents (Lenz's Law), the relation of primary and secondary currents, the electromotive force of induced currents, the construction and action of an induction coil, self-induction, the construction and action of the step-up and step-down transformer.

Long distance transmission of electricity as illustrated in the Hydro-Electric System of Ontario.

Electric measurements.

The volt, ohm, watt, and watt-hour.

Ohm's Law.

Construction and action of the ammeter, voltmeter, and Wheatstone bridge.

Special forms of radiation.

Electric waves as related to heat rays, light rays, ultra-violet and X-rays. Radiant energy. The wave theory.

Laboratory Equipment for Teaching Middle School Physics

Each group of two or three pupils should be provided with a set of apparatus consisting of the following:—

Sound

1 Tuning Fork, C, unmounted.
1 Tuning Fork, A, unmounted.
2 Telescoping Brass Tubes, each about 15 inches long, large one 1¼ inches diameter.
1 Violin Bow.
2 Brass Plates, one square and one circular.
1 Clamp for Vibrating Plates.

Heat

1 Air Thermometer Bulb.
1 Dew Point Apparatus.
1 Ball and Ring.
1 Compound Bar.
1 Calorimeter.
1 Chemical Thermometer, graduated in Centigrade and Fahrenheit degrees.
1 Pound Copper Shot or a copper block weighing about 500 grams.
1 Pound Lead Shot or a lead block weighing about 500 grams.
1 Leslie's Differential Thermometer.
1 Leslie's Cube.
1 Conductometer.

1 Spirit Lamp or Bunsen burner.
1 Retort Stand with two rings.
1 Sheet of Asbestos Gauze.
2 Beakers, 200 and 400 c.c.
1 Florence Flask, 300 c.c.
1 Yard Rubber tubing, 3/16 inch inside.

Light

1 Metre Stick.
1 Lens Support.
1 Screen Support.
1 Pin Support (rubber cork).
2 Mirror Supports.
1 Single Candle Holder.
1 Screen.
1 Bunsen Screen.
1 Paraffin Candle.
1 Pin Hole Camera.
1 Spherical Concave Mirror, 5cm. in diameter, 25 cm. focal length.
1 Spherical Convex Mirror, 5cm. in diameter, 25 cm. focal length.
2 Plain Glass Mirrors, 10 cm. x 15 cm.
1 Equilateral Prism.
1 Right-angled Prism.
1 Index of Refraction Plate, 10 x 6 x 2 cm.
1 Converging Lens, focal length 20 cm.
1 Diverging Lens, focal length 25 cm.
1 Plane Mirror, 4 inches x 1 inch.
2 Hat Pins.

Electricity and Magnetism

2 Bar Magnets.
1 Horseshoe Magnet.
1 Magnet Board, with groove for magnet.
1 Shaker for Iron Filings.
1 lb. Fine Iron Filings.
1 Compass, 1-inch diameter.
1 Bar Soft Iron, round, 6 inches long.
1 Bar Soft Iron, round, 15 inches long.
1 Plate of Soft Iron, 6 x 8 x ¼ inch.
1 Plate of Glass, 6 x 8 x ¼ inch.
2 Knitting Needles.
1 Package Iron Tacks.
1 Set of Six Elements in Electromotive series.
1 Galvanoscope.
2 Dry Cells.
1 Rheostat, circular, 10 ohms, to control battery current.
1 Spool Double Covered Magnet Wire, No. 20, to be used for making Electro-magnets, etc.
2 Small Incandescent Lamps (3 volts).
1 St. Louis Motor, or other dissectible type.
1 Set Telegraph Instruments (key and sounder).
1 Electric Bell.

1 Pair of Lead Plates, to illustrate storage cell.
1 Simple form of Electrolysis Apparatus.
1 Voltmeter, small.
1 Ammeter, small.
1 Copper Voltameter, simple.
1 Glass Friction Rod.
1 Vulcanite Friction Rod.
1 Flannel Exciting Pad.
1 Silk Exciting Pad.
1 Cat Skin.
1 Dozen Pith Balls.
2 Insulating Stands, for suspending Pith Balls.
1 Spool Silk Thread.
1 Electrophorus (small).
1 Electroscope, flash form.
1 Pair Condenser Plates.
1 Proof Plane.

General Physics Apparatus

In addition to the apparatus specified above, the Physics Laboratory should be supplied with the following pieces of apparatus for class demonstrations:

Sound

1 Set of Sympathetic Tuning Forks, mounted.
1 Bell in Vacuo.
1 Kundt's Apparatus.
1 Savart's Wheel.
1 Interference of Sound Apparatus (Fig. 232, Text).
1 Siren.
1 Sonometer.
1 Whistle of Glass with Sliding piston and mouthpiece.
1 Organ Pipe, one side of glass, with membrane on sliding frame.
1 Resonance Jar.
1 Brass Rod with clamp to show longitudinal vibrations, 100 cm.
1 Coiled Spring to illustrate wave motion.

Heat

1 Davy Safety Lamp.
1 Radiometer.
1 Convection Apparatus, for air.
1 Convection Apparatus, for liquids.
1 Wet and Dry Bulb Hygrometer.
1 Distillation Apparatus.
1 Hope's Apparatus.
1 Charles' Law Apparatus (Fig. 263, Text).

Light

1 Optical Disc, with all attachments.
1 Bunsen Photometer.
1 Newton's Colour Disc and Rotator.

1 Projection Lantern for projecting both lantern slides and opaque objects.
1 Converging Lens, large, mounted on stand.
1 Large Glass Refraction Tank.
1 Direct Vision Spectroscope.
1 Quadruple Candle Support.
1 Shadow Photometer.
1 Diffusion Photometer.
1 Set of Coloured Glass Plates to illustrate absorption and transmission of light.

Electricity and Magnetism

1 Wheatstone Bridge.
1 Resistance Box.
1 Natural Magnet.
1 D'Arsonval Galvanometer.
1 Tangent Galvanometer.
1 Ammeter.
1 Voltmeter.
1 Water Voltameter (electrolysis of water apparatus).
1 Copper Voltameter.
1 Large Induction Coil.
1 Arc Lamp, with simple Regulator.
1 Set of Coils for demonstrating the Laws of Current Induction.
1 Storage Battery.
1 Dissectible D.C. Motor.
1 Dipping Needle.
1 Gravity Cell.
1 Leclanché Cell.
1 Electrophorus (large).
2 Compass Needles, large, on stands.
1 Horseshoe Electro-magnet.
1 The Elements of an Electric Iron.
1 Current Rectifier.
1 Model Transformer.
1 Lamp Rheostat Board.
1 Variable Rheostat.
1 Static Machine, Wimhurst.
1 Electric Plume.
1 Electric Chime.
1 Electric Whirl.
1 Faraday's Bag.
1 Set Biot's Hemispheres and hollow globe.
1 Insulated Conductor Ellipsoidal to show unequal distribution of charge.
1 Pair of induction Spheres.
2 Leyden Jars.
1 Jointed Discharger.

CHEMISTRY

An experimental study of the following elements and their more important compounds: hydrogen, oxygen, sulphur, sodium, potassium, nitrogen, chlorine, bromine, iodine, carbon, calcium.

The laboratory experiments described in the Chemistry Manual should be performed by the pupils, working either singly or in small groups, except in the case of those experiments classed as "Demonstrations." These may be performed by the teacher or by selected pupils.

This experimental work should develop accuracy of observation and care in reaching conclusions. Copious notes are undesirable but the representation of apparatus, method, and results, by means of diagrams should be encouraged.

Study of the commercial value of the following elements and compounds: hydrogen, oxygen, nitrogen, chlorine, sulphur, carbon, nitric acid, sodium nitrate, potassium nitrate, common salt, bleaching powder, hydrochloric acid, sulphuric acid, carbon dioxide, carbon monoxide, acetylene, coal gas, calcium carbonate, sodium hydroxide, sodium carbonate, gypsum.

An experimental study of: mixtures, solutions, compounds and elements; oxides, acids, bases and salts.

Fundamental laws and principles, as: conservation of weight, definite proportions, proportions by volume in which gases react; experiments on the law of definite proportions.

The quantitative meaning and use of chemical symbols, chemical equivalent, atomic weight, molecular weight, formulae and equations.

Chemical nomenclature; valency.

Simple problems involving the calculation of formulae, equations and percentage composition, the law of definite proportions and the changes in the volume of gases due to changes in temperature and pressure.

The course is covered in the authorized text, A First Course in Chemistry, and in the authorized Chemistry Manual.

AGRICULTURE AND HORTICULTURE

Regulations

The Regulations for the Lower School apply also to the Middle School. Similar requirements as regards the instruction and examinations shall be met for both the Lower School and the Middle School, as follows:

(a) Application for permission to introduce the work shall be sent to the Deputy Minister of Education, Toronto.

(b) The instruction shall be given by a teacher who holds a Specialist's certificate or an Intermediate certificate in Agriculture.

(c) The course is intended to extend over two years and the provision therefor in the teacher's time-table shall be at least three periods a week of 40 minutes each, or the equivalent thereof.

(d) In addition to the school work, home projects, supervised by the teacher shall be carried out by pupils. Systematic records of this work shall be kept by the pupils.

The following are the details of the Course:—

PART I—(First Year)

Heat

Nature and Sources of Heat: Experiments to show that energy of motion (kinetic energy), chemical energy, electrical energy, and radiant energy may be converted into heat.

The sun as a source of heat.

Temperature: Experiments to show the expansion and contraction of solids, liquids, and gases due to changes in temperature; the temperature at which the density of water is at a maximum.

The principle of the internal combustion engine.

Quantity of Heat: Quantity of heat as contrasted with temperature; heat unit (the calorie); specific heat.

Change of State due to Heat: experiments to illustrate the heat of fusion of ice and the heat of vaporization of water, cooling by evaporation, dew point.

Transference of Heat: experiments to show conduction and convection of heat, the absorption and emission of heat by different surfaces.

Light

Nature and Sources of light: the transmission of light.

Experiments to show that light travels in straight lines through a medium of uniform density, the forming of shadows, the measurement of the intensity of light by means of a shadow or a diffusion photometer.

Reflection of Light: experiments to show the laws of reflection and the formation and position of an image in a plane mirror.

Refraction of Light: experiments to show refraction and the principle of the converging lens. The simple magnifying lens.

Light in Relation to Agriculture: the influence of light on the growth of plants, the colour of fruit, pathogenic bacteria and the growth of animals.

Magnetism

Experiments to show the laws of magnetic attraction and repulsion, magnetic lines of force, magnetic field, magnetism by induction, magnetization.

Electricity

Static Electricity: experiments to show electrical attraction and repulsion, the two kinds of electrification, conductors and non-conductors, electrification by contact and by induction, the residence of electric charges on the surfaces of conductors, the distribution of an electric charge on a surface, the escape of electric charges from points.

Means of preventing damage by lightning.

Experiments with the gold leaf electroscope, electrical condenser, and the Leyden jar.

Current Electricity: experiments to show the production of an electric current by using cells having plates of different kinds.

Methods of determining the presence and the direction of electric currents (the galvanoscope).

The dry cell.

Simple ideas of electromotive force, current strength and resistance. The ohm, the volt, and the ampere. Ohm's Law.

Care and use of the storage cell.

Experiments to show the magnetic effects of an electric current, the electro-magnet, the relation between the direction of the currents and the polarity of an electro-magnet, the magnetic field due to an electric current.

Construction and action of the electric bell and the D.C. motor.

Experiments to show the transformation of electric energy into heat (the electric iron, the incandescent lamp).

Induced currents: experiments to show the production and direction of induced currents (Lenz's Law) the relation of primary and secondary currents, the electromotive force of induced currents, the construction and action of an induction coil, self-induction, the construction and action of the step-up and the step-down transformer.

Long distance transmission of electricity as illustrated in the Hydro-Electric System of Ontario.

Mechanics

The principle and use of levers and pulleys.

Soil Physics

The effects of drainage on soil temperature, soil air, soil moisture, and soil bacteria.

Botany

Parasitic fungi: the examination of spores and mycelia by means of a compound microscope; the recognition, from specimens, of rusts, smuts, late blight of potato, brown rot of stone fruits, mildew of cherry or lilac, anthracnose of bean.

The importance of pure seed.

Determination of the percentage of foul seed in three or four samples of clover (or alfalfa) and timothy.

Entomology

Life history, nature of injury wrought, and methods of control of the following injurious insects: white grub, wire worms, plum curculio, oyster shell scale, cabbage maggot, cabbage butterfly, European corn borer, tomato worm, tent caterpillar, aphides.

Life history and habits of the following beneficial insects: dragon fly, ichneumon fly, ladybird beetle.

Insecticides and Fungicides

Uses of arsenate of lead, arsenate of lime, Paris green, lime-sulphur, Bordeaux mixture, and orchard "dusts."

Field Crops

Different types of farming; crop distribution over Ontario, meaning and importance of crop rotation; influence of the keeping of live stock on the kind of rotation; germination test of seed, e.g., oats, turnips, corn, clover; laboratory work in seed judging and seed selection; meaning and merits of pasture crops, silage crops and soiling crops.

PART II—(Second Year)

Chemistry: an experimental study of the following elements: carbon, oxygen, hydrogen, nitrogen, chlorine, iodine, phosphorous, sulphur, sodium, potassium, calcium, and the compounds of these elements that have a direct bearing upon agriculture, such as carbon monoxide, carbon dioxide, water, ammonium hydroxide, ammonia gas, ammonium sulphate, nitric acid, hydrochloric acid, phosphorous pentoxide, sulphur dioxide, sulphuric acid, sodium chloride, sodium nitrate, sodium hydroxide, sodium carbonate, sodium bicarbonate, potassium chloride, potassium nitrate, potassium hydroxide, calcium oxide, calcium hydroxide, calcium carbonate, calcium bicarbonate, calcium sulphate, the calcium phosphates.

A study of the industrial methods of preparation of the above compounds is not required.

The determination of the chemical equivalent of an element (magnetism).

The quantitative meaning and use of chemical formula and equations; chemical nomenclature; simple arithmetical problems involving formulæ and percentage composition.

Formation and texture of soil; soil profile, losses of plant nutrients (nitrogen, phosphorous, potassium and calcium compounds) by leaching and cropping; addition of nitrogen by rainfall and soil organisms (root organisms included); nitrification; acidity,—its detection and correction; influence of nitrogen, phosphorus and potassium on plant growth; need of plant nutrients as influenced by the growing period of the plant, range of root and ability to obtain the nutrients required.

Barnyard Manure and Fertilizers: composition, care and treatment of barnyard manure; commercial sources of nitrogen, phosphorous and potassium used to supplement barnyard manure; test for nitrates, phosphates and potassium salts; experiments to prove the presence of and to show the relative solubility of the various forms of phosphates. Experiments to show why certain fertilizers should not be mixed; calculation of the amounts and cost of materials required to make fertilizer mixtures of different percentage composition; explanations of the commercial terms "phosphoric acid" and "potash." The Fertilizers Act, 1922, sections 1,2,3,4,5,8.

Poultry: practical operation of the incubator—ventilation, provision for moisture, the candling of eggs, the examination of eggs broken open every one or two days during the period of incubation to observe the development of the embryo. Methods of preserving eggs; the grading of eggs; poultry products and marketing; culling of poultry for egg production.

Dairying: principles and uses of the Babcock machine and the Lactometer; testing cream and skim milk for fat; determining whether milk has been watered by use of the formula—L.R. at 60 degrees plus percentage of fat divided by 4 equals S.N.F.; food value of milk and its product; principle and use of the milk separator; making butter with a laboratory churn; use of starters.

Animal Husbandry: the chief breeds of draught horses, cattle, sheep, swine; value and importance of live stock; a survey of the breeds found in the locality; meaning of pedigreed stock and grade stock; disadvantage of keeping scrub stock; visit to a local farm to study the stock kept there.

OR

Horticulture: orchard management—spraying, pruning, grafting, cultivating; cover crops; packing and marketing apples; methods of producing early vegetables; practice in seeding, transplanting, cultivation, mulching; a visit to a fruit farm or a market garden to study the methods employed there.

LATIN AND GREEK

In the third year the course in grammar and composition begun in the Lower School are to be continued. The introductory lessons in the Latin book should be completed during the year, and the reading of Cæsar continued. Special attention should be paid to Sight Translation and regular periods assigned thereto.

In the fourth year the work prescribed for the Middle School examination should be completed. Attention is directed to the prescription as outlined in the Curriculum for Matriculation issued by the several Universities.

FRENCH, GERMAN, SPANISH, ITALIAN

The methods outlined in connection with the Lower School courses should be continued, as far as possible, in the Middle School. For details of the courses, teachers should consult the Curriculum for Matriculation issued by the several Universities.

A.—French:

The texts prescribed.
Composition.
Sight work.

The course in Grammar upon which the examination in French Composition of the Middle School is based, consists of 51 chapters of the present prescribed Grammar, together with the common Irregular Verbs. The continuous passages of English for translation into French will be based on the prescribed texts.

B.—German:

The texts prescribed.
Composition.
Sight work.

The course in Grammar upon which the examination in German Composition of the Middle School is based consists of the following parts from the Revised Edition of the High School German Grammar:

Exercises 1-25, with special emphasis on 1-18 inclusive; Reading Selections 122-132; the first 10 Topics; the common Irregular Verbs.

The Grammar, beginning on page 156, is intended to be for reference only and to be used by the student in this way. No definite amount can be

assigned, but special attention should be given to the parts which have reference to exercises 1-18.

The continuous passages of English for translation into German will be based on the prescribed texts.

C.—Spanish:

The texts prescribed.
Composition.
Sight work.

The course in Grammar upon which the examination in Spanish Composition is set consists of the first 40 lessons of the Spanish Grammar together with lesson 47 and the common Irregular Verbs. The continuous passages of English for translation into Spanish will be based on the prescribed texts.

D.—Italian:

The texts prescribed.
Composition.
Sight work.

The continuous passages of English for translation into Italian will be based on the prescribed texts.

ART

Note.—The following is suggested as a suitable course in Art in the Middle School. It will not be accepted for admission to the Universities, but may be used for the purposes of the Graduation Diploma, and also for admission to the Normal Schools in lieu of a Lower School certificate in Art. When used for these purposes sections I and III are obligatory, and an option is allowed between section II and section IV.

I. Freehand drawing: review of such parts of the Lower School course as may be found necessary.

Mediums: pencil and water colour with such other mediums as the teacher may approve.

Freehand drawing in outline, in neutral values and in colour, of studies selected from the following:

(1) Still life groups.
(2) Characteristic Canadian trees in their immediate natural setting, maple, elm, oak.
(3) Foliage and fruit of such trees as the pine, cedar, larch, maple and oak.
(4) Smaller domestic animals such as the cat, dog *or* rabbit; or examples from the school museum such as the squirrel, mink *or* raccoon.
(5) Articles of furniture such as chairs, tables and buffets.
(6) Articles of apparel such as coats, hats and boots.
(7) Room interiors.
(8) Building exteriors.
(9) Casts of ornament.

Careful attention shall be given:

(1) To the expression of light and shade, texture, and character.

(2) To grouping.

(a) From study of scattered objects to draw a well-composed group.

(b) To draw from memory a group of common objects to illustrate a subject such as "gardening," "preserving," "music."

(3) Memory drawing.

(4) Figure drawing should be encouraged wherever special ability is shown.

II. Design.

Review of such parts of the Lower School course as may be found necessary

Mediums:
Pencil, water colour, lettering pen and waterproof India ink.

(Tempera colours may be substituted for ordinary water colours where considered more suitable).

A. Principles of Design.

Practice in the principles of design may be given in a selection from the following:

(1) Designs for embroidery, beading and braiding for dress and dress accessories.

(2) Designs for doilies, runners, cushions and curtains and other home furnishings.

(3) Designs for ornamental ironwork, as for fences, gates, brackets, hinges, registers, ornamentation on wood as on trays, book-ends, tea-pot stands.

(4) Designs for the decoration of the printed page:

(a) Variations of the classic Roman alphabet.

(b) Book-plates.

(c) Trade-marks and calligrams.

(d) Posters and window show-cards.

(e) Simple illumination.

(f) Head pieces and tail pieces.

Teachers may substitute (4) above for (1), (2), and (3) above.

(5) Designs developed from a study of historic Greek ornament.

Colour sense may be developed:

(1) In the perception of colour in natural forms such as the leaf, fungus, shell, rock, feather, butterfly.

(2) In the creation of colour schemes for home and school decoration.

(3) In the application of these colour schemes to design.

B. Practical Application of Design.

The following are recommended:

(1) The cutting of stencils for the transfer of patterns to objects of use and adornment.

(2) The modelling of simple forms in clay or plasticine.

(3) The designing, and moulding in coloured cement of simple tile patterns.

III. Appreciation.

A comparative study of masterpieces of painting, of sculpture, of the outstanding characteristics of the principal styles of architecture, and of the leading periods of furniture.

IV. Applied Mechanical Drawing.

(1) Care and use of mechanical instruments; the dividers, the compass, the ruling pen, the bow-pen, the scale, the T-square, the set square (30° and 45°), the French curve.

(2) (a) The conventional lines used in making and dimensioning working drawings.

(b) The conventional lining of sections of the various kinds of material.

(3) The practice of a style of freehand lettering founded upon the single stroke Gothic, inclined and vertical.

(4) The working of basic problems such as:—

1. To bisect a straight line.
2. To erect a perpendicular to a given line at a given point in the line.
3. To draw a perpendicular to a given line from a point outside the line.
4. To erect a perpendicular to a given line from a point at its end.
5. To draw a line parallel to a given line at a given distance from it.
6. To construct an equilateral triangle on a given base.
7. To construct a square on a given base.
8. To inscribe a square within a given circle.
9. To bisect a given angle.
10. To trisect a right angle.
11. To construct at a given point in a given line an angle equal to a given angle.
12. To divide a given line into any number of equal parts.
13. To inscribe a regular hexagon within a given circle.
14. To construct a regular hexagon upon a given line.
15. To construct a regular octagon within a given square.
16. To draw a tangent at any point in a given circumference.
17. To inscribe a circle within a given triangle.
18. To construct an equilateral triangle when the altitude is given.
19. To circumscribe a square about a given circle.
20. Within a given circle to draw any number of equal circles tangent to each other and to the given circle.
21. To draw an ellipse whose axes are given.
22. To draw an egg-shaped oval.
23. To draw a spiral.

(5) Orthographic projection of type solids and of a few common objects.

1. To draw top view, front view, and when required, side view of a cube, a pyramid, a cylinder, a cone, and a hexagonal prism.
2. To make a working drawing and surface pattern,—

(a) of a funnel.
(b) of a two-part right-angled elbow.
(c) of a lamp shade.

(6) The designing and drawing of patterns with a geometric treatment:
  (a) in a square and a rectangle and a circle;
  (b) of repeating surface patterns;
  (c) of borders (fret, Guilloche, wave).
  (d) of tracery of Gothic windows.

(7) The drawing of cross sections and of elevations of simple standard mouldings.

(8) Working drawings:

1. Of metal, such as screw threads, bolt heads and nuts; easy machine parts; tools, such as wrench and plane.
2. Of wood, such as mallet, clamp, book-stall, table, cabinet.

(9) Architectural drawings:

Plans and elevations of a cottage or a bungalow, with details of doors and windows.

(10) Historic and modern forms of the arch.

MUSIC

The Lower School Course continued and extended. The following are the details of the course:

To harmonize a figured bass in four parts using common chords and chords of the dominant seventh with their inversions. The bass may include modulations to nearly related keys, suspensions and passing notes.

To harmonize a simple melody in four parts. This may include suspensions and unaccented passing notes but no modulations.

To answer general questions on the life and works of one composer and to display a knowledge of a specified work by that composer. Such questions only will be set as may serve to test the candidate's familiarity with an intelligent and appreciative comprehension of the prescribed work.

The name of the composer whose life and works are to be studied is specified in the Matriculation Calendar of the University of Toronto.

BOOKKEEPING AND PENMANSHIP

The Lower School Course continued and extended.

STENOGRAPHY AND TYPEWRITING

The Lower School Course continued and extended.

MANUAL TRAINING

The Lower School Course continued and extended.

HOUSEHOLD SCIENCE

The Lower School Course continued and extended.

UPPER SCHOOL SUBJECTS

ENGLISH COMPOSITION

The Middle School Course continued and extended.

The principles of composition systematically studied.

Notes.—1. Good composition in all written work and clear and comprehensive answers in all oral work should be demanded by every teacher. For the study of models of prose writing the volume of Short Stories and Essays will be found useful.

2. The question paper in English Composition will test the candidate's ability:

(a) To write a short essay from a carefully selected list of topics which should require not more than an hour or an hour and a half to write;

(b) (i) to reproduce in shorter form the substance of a given passage;

OR

(ii) to write a short appreciation of the merits of a given paragraph of good prose;

(c) to construct sentences and to use words correctly in one or more of the following ways:

(i) by explaining the meaning of phrases and longer statements in a given passage;

(ii) by correcting sentences that are faulty in grammar or syntax and by explaining the reasons for these corrections;

(iii) by defining words and by showing how to use them correctly in sentences.

At least 60 per cent of the marks assigned to the whole paper will be assigned to question 1 (the essay).

ENGLISH LITERATURE

Intelligent and appreciative study of suitable authors, both prose and poetry, including those prescribed for the Departmental and University Matriculation examinations.

Systematic oral reading by pupils of the texts studied in class.

Supplementary reading provided by the pupils themselves or supplied from the school and the public library.

Memorization and recitation of choice selections in prose and poetry prescribed by the Department and of others made by the teacher.

Note.—At this stage the pupil should have acquired some power of appreciating literature and literary art; but the chief object continues to be the cultivation of a taste for good literature, and critical study should be subordinated thereto.

MODERN WORLD HISTORY, 1789-1920

Note.—The course in Modern World History includes the geography relating to the History prescribed.

1. (a) A survey of political and social conditions in France on the eve of the French Revolution. A brief comparison with conditions in Great Britain.

(b) The French Revolution, 1789-1799, and its influence on the British and other peoples.

2. The Napoleonic Era, 1799-1815.

3. European History, 1815-1848: Metternich and the reaction after 1815; the growth of Liberalism and Nationalism; the Revolutions of 1848.

4. European History, 1848-1875: Italian Unity—Mazzini, Garibaldi, Cavour; the rise and fall of the Second Empire and the foundation of the Third Republic in France; Bismark and German unity.

5. The Industrial Revolution in Great Britain, 1750-1850.

6. The progress of parliamentary and social reform in Great Britain and Ireland during the period.

7. The expansion and political development of the British Empire, 1789-1920.

8. A brief treatment of the following topics in the history of the United States: Westward expansion; the Civil War; the Munro Doctrine.

9. International relations, 1870-1914; the formation of the rival alliances and the causes of the Great War.

10. The War, 1914-1918; the peace treaties; the League of Nations.

Books of Reference

Modern Europe and the World. R. Flenley. J. M. Dent & Sons, Toronto.
A History of Modern Times from 1789 to the present day. D. M. Kettelbey. Clarke, Irwin & Co.

ALGEBRA

The course of the Middle School reviewed and extended.

Linear factors of a polynomial and numbers giving it the value zero.

Ratio, proportion and variation.

Series: arithmetic, geometric, arithmetico-geometric, harmonic, powers of natural numbers.

Maxima and minima.

Permutations and combinations.

Binomial Theorem: general statement of, but proof for positive integral exponents only, applications for all exponents.

Interests forms and annuities.

GEOMETRY

Note.—Part C is required of all candidates; an option is allowed between Part A and Part B.

Part A. Synthetic Geometry

Exercises on the course prescribed for the Middle School. The following topics with exercises thereon: loci; maxima and minima; the system of

inscribed, escribed, and circumscribed circles of a triangle; radical axis; harmonic ranges and pencils.

The following propositions in Synthetic Geometry, with exercises thereon:

To divide a given straight line internally and externally in medial section.

To describe a square that shall be equal to a given rectilineal figure.

To describe an isosceles triangle having each of the angles at the base double of the third angle.

To inscribe a regular pentagon in a given circle.

The squares on two sides of a triangle are together equal to twice the square on half the third side and twice the square on the median to that side.

If A. B. C. be a triangle, and A be joined to a Point P of the base such that $BP : PC = m : n$, then $n\,AB^2 + m\,AC^2 = (m+n)\,AP^2 + n\,BP^2 + m\,PC^2$.

In a right-angled triangle the rectilineal figure described on the hypotenuse is equal to the sum of the similar and similarly described figures on the two other sides.

If the vertical angle of a triangle be bisected by a straight line which also cuts the base, the rectangle contained by the sides of the triangle is equal to the rectangle contained by the segments of the base, together with the square on the straight line which bisects the vertical angle.

If from the vertical angle of a triangle a straight line be drawn perpendicular to the base, the rectangle contained by the sides of the triangle is equal to the rectangle contained by the perpendicular and the diameter of the circle described about the triangle.

The rectangle contained by the diagonals of a quadrilateral inscribed in a circle is equal to the sum of the two rectangles contained by its opposite sides.

If two similar polygons have the sides of one respectively parallel to the corresponding sides of the other, the straight lines joining corresponding vertices are concurrent.

If a transversal cuts the sides, or the sides produced, of a triangle, the product of one set of alternate segments taken in circular order is equal to the product of the other set, and conversely. (Menelaus' Theorem).

If from the vertices of a triangle concurrent straight lines be drawn to cut the opposite sides, the product of one set of alternate segments taken in circular order is equal to the product of the other set, and conversely. (Ceva's Theorem).

If a point A lie on the polar of a point B with respect to a circle, then B lies on the polar of A.

Any straight line which passes through a fixed point is cut harmonically by the point, any circle, and the polar of the point with respect to the circle.

In a complete quadrilateral each diagonal is divided harmonically by the other two diagonals, and the angular points through which it passes.

Part B. Solid Geometry

Definitions: general description of figures in three dimensions. The following propositions, with exercises thereon:

A plane is determined by (a) three points not in a straight line, (b) a straight line and a point not on it, (c) two intersecting straight lines, (d) two parallel straight lines.

Two intersecting planes cut one another in a straight line and in no other point.

If two straight lines are parallel, any plane intersecting one of them intersects the other.

If two planes are parallel, any straight line intersecting one of them intersects the other.

If a straight line is perpendicular to two intersecting straight lines at their point of intersection, it is perpendicular to every straight line in their plane through their point of intersection.

Conversely, all straight lines intersecting a given straight line at a given point and perpendicular to it lie in a plane.

If one of two parallel straight lines is perpendicular to a plane, the other is also.

Conversely, if two straight lines are perpendicular to the same plane, they are parallel.

If a straight line be at right angles to a plane, any plane through the line is perpendicular to the plane.

To draw a perpendicular to a given plane from a given point.

One and only one straight line can be drawn through a given point and perpendicular to a given plane.

The perpendicular from a given point to a plane is the shortest distance from the point to the plane.

If two straight lines are parallel to the same straight line they are parallel to each other.

If two intersecting straight lines are parallel respectively to two other intersecting straight lines the contained angles are equal.

If two planes have a common perpendicular they are parallel, and conversely.

If two intersecting straight lines are respectively parallel to two other intersecting straight lines, the plane of the first two is parallel to the plane of the second two.

Straight lines which are cut by three or more parallel planes are cut proportionally.

To draw a perpendicular to two given straight lines not in the same plane.

There is only one common perpendicular to two straight lines not in the same plane.

In a trihedron the sum of any two angles at the vertex is greater than the third; and the sum of the three angles is less than four right angles.

In a polyhedron the sum of the number of faces and the number of corners or vertices is two greater than the number of edges.

There are not more than five regular polyhedra.

The four diagonals of a parallelepiped are concurrent and bisect one another.

The four straight lines which join vertices of a tetrahedron to the centroids of the opposite faces meet in a point which divides them in the ratio of 3:1; and the three straight lines which join the middle points of opposite edges meet in the same point and are bisected there.

Any plane section of a pyramid taken parallel to the base is similar to the base, and the area of such a section varies as the square of its distance from the vertex.

The volumes of two pyramids of equal heights and equal base areas are equal.

One sphere and only one can pass through four points not in the same plane.

Mensuration of volumes, surfaced areas, linear measurements including the development of the formulæ, in the following: Prism, pyramid; cylinder; cone; frustrum of cone, pyramid or sphere; zone of sphere.

Part C. Analytical Geometry

Axes of co-ordinates. Position of a point in plane of reference.

Transformation of co-ordinates—origin changed or axes (rectangular) turned through a given angle.

Area of a triangle in terms of the co-ordinates of its angular points.

Co-ordinates of the point dividing a straight line in a given ratio.

The distance between two points.

The various forms of the equation of a straight line.

The angle between two given straight lines.

Conditions of perpendicularity and of parallelism.

Distance from a point to a straight line along a given direction.

Perpendicular distance from a point to a straight line.

The various forms of the equation of a circle.

Tangent at a point and from a point.

Tangent in a given direction.

Polar of a point.

If a point moves along a straight line, its polar revolves about the pole of that line.

The length of the tangent from a point to a circle.

The radical axis of two circles.

Easy exercises on the preceding.

TRIGONOMETRY

Measurements of angles; the right angle and the radian.

Trigonometrical ratios, relations among them, ratios of certain angles such as 30°, 45°, 60°, 150°, 210°, 330°.

Ratios of the sum and difference of angles, deduced formulæ.

Relations between sides and angles of a triangle.

Use of logarithms.

Solutions of triangles, with problems.

Area of a triangle.

Circumscribed, inscribed, and escribed circles.

Inverse functions.

Easy exercises on the preceding.

PHYSICS

A course defined as follows, the topics to be presented experimentally with mathematical applications simple and direct in character:

Mechanics of Solids

Metric and English units of length. Use of vernier calipers, screw-gauge, in measurement of wires, cylinders, spheres, plates, etc.; unit of time.

Motion: velocity, uniform and variable; average velocity; velocity at a point.

Newton's first law of motion, force, inertia, and mass; metric and English units of mass.

Acceleration measurement of uniform acceleration, acceleration due to gravity, value of g.

Momentum: Newton's second law, measurement of force, metric and English absolute and gravitational units of force.

Newton's third law; conservation of momentum; centripetal and centrifugal force with illustrations, centrifuge, cream separator, form of earth, etc.

Composition and resolution of forces; parallelogram of forces; triangle of forces; moments, couples; centre of gravity.

Friction; laws of friction; co-efficient of friction.

Gravitation: Newton's laws of gravitation; Cavendish's experiment.

Work: measurement of work in metric and English absolute and gravitational units; energy; measurement of energy; kinetic and potential energy; conservation of energy.

Power: measurement of power; horse power; the watt.

Machines; mechanical advantage; lever; wheel and axle; pulley; inclined plane; screw; wedge; simple combinations of the foregoing.

Mechanics of Fluids

Pressure: pressure at a point; Pascal's law; pressure due to gravity; equilibrium of fluids at rest; Archimedes' Principle; buoyancy; hydraulic pressure; specific gravity; determination of specific gravity of solids and liquids.

Atmospheric pressure: Barometers; weight of air; pressure due to molecular motion; lift and force pumps; siphon; the use of compressed air, air-brakes, air tools.

Velocity due to pressure: Torricelli's theorem; pressure in a moving column of fluid varies with the velocity; application to explain the principle of the atomizer, the Bunsen burner, the Bunsen filter pump, forced draught, the curved flight of a ball.

Surface tension; surface force; surface energy; capillarity; practical applications.

Transformation of Energy

Mechanical equivalent of heat, measured mechanically and electrically; measurement of electrical energy; the kilowatt hour.

Laboratory Equipment for Teaching Upper School Physics

Mechanics and Properties of Matter

Apparatus for determination of average velocity and acceleration.
Apparatus to show relation of force to acceleration.
Guinea and Feather Tube.

Apparatus to determine acceleration due to gravity.
Apparatus for demonstrating parallelogram, triangle, and polygon of forces.
Apparatus for investigating parallel forces.
Apparatus for demonstrating laws of friction.
Air Pump and Receiver.
Elastic Rubber Balloon. A toy balloon answers well.
Transmission of Pressure Apparatus.
Apparatus for demonstrating equilibrium of fluids under action of gravity.
Apparatus for determination of whole pressure.
Archimedes' Principle.
Globe for weighing air.
Barometer Tube, heavy glass.
Standard Barometer.
Mariotte's Law Tube.
Lift Pump, glass model.
Force Pump, glass model.
Hydraulic Press, glass model.

Surface tension and Flow of Fluids

Capillary tubes, set of.
Small and large tube connected.
Glass cell and "pill-box" pulley.
Surface tension wires.
Separating funnel.
Two-compartment cell, for projection.
Apparatus of vertical jet (Torricelli's).
Tube of varying size with pressure tubes.
Atomizer.
Jet Pump, glass model.
Bunsen jet pump.
Hollow glass bulbs, set of 4.

CHEMISTRY

Chemistry of the Middle School reviewed and continued.

Rate of reaction and conditions that affect in (including catalysis), e.g., the action of oxalic acid in the presence of sulphur acid on a dilute solution of potassium permanganate; the souring of milk.

Reversible reactions, chemical equilibrium and the conditions that effect equilibrium, e.g., ice $\rightleftharpoons$ water, water $\rightleftharpoons$ water vapour, ice $\rightleftharpoons$ water vapour, a salt (sodium sulphate) in equilibrium with a saturated solution, limestone $\rightleftharpoons$ quicklime and carbon dioxide, bluestone $\rightleftharpoons$ anhydrous copper sulphate and water, ferric chloride and ammonium sulphocyanate $\rightleftharpoons$ ferric sulphocyanate and ammonium chloride (in solution).

A study of the following elements and their compounds illustrated as far as possible by laboratory experiments and having regard to Mendelejeff's classification: hydrogen, sodium, potassium, magnesium, zinc, calcium, aluminium,

carbon, lead, nitrogen, phosphorus, arsenic, antimony, oxygen, sulphur, chlorine, bromine, iodine, iron, copper, silver.

Qualitative Analysis:

The detection of the metal and the acid radical in solutions of the following salts: lead nitrate, silver nitrate, copper sulphate, antimony chloride, arsenic chloride, iron sulphate, aluminium sulphate, zinc chloride, magnesium sulphate, sodium sulphite, potassium carbonate, ammonium phosphate.

Vapour tension (pressure):

The vapour tension of (1) benzene, (2) water, (3) water and benzene as determined by introducing a few drops of the several liquids into the vacuum of a mercury barometer.

Elementary notions of dissociation (ionization) as derived from such experiments as the following: the change in colour due to the gradual dilution of a water solution of copper bromide or copper chloride, the precipitation of barium chloride from a solution of barium chloride by the addition of hydrochloric acid, electrolysis.

Hydrolysis, as illustrated in the acid reaction of a solution of copper sulphate and the alkaline reaction of a solution of washing soda.

A study of the properties and uses of the following commercially important compounds: sodium chloride, baking soda, washing soda, caustic soda, potassium nitrate, sodium nitrate, potassium permanganate, magnesium sulphate, zinc sulphide, zinc oxide, calcium carbide, plaster of Paris, alum, white lead, ammonium nitrate, superphosphate of lime, white arsenic, lead arsenate, steel, bluestone.

The following processes in the extraction of a metal from its ore; roasting, reducing, electrolysis and solution, as exemplified in the extraction of iron, zinc, lead, nickel, aluminium, copper and gold.

Organic Chemistry:

Alcohols, acids and esters (fats); methyl alcohol, ethyl alcohol, glycerine, acetic acid, stearic acid, ethyl acetate, tallow and lard.

Soap making.

Carbohydrates: glucose, cane sugar, starch, cellulose.

Hydrolysis of starch.

Proteins as constituents of food such as milk.

These organic compounds should be treated from the descriptive point of view and few formulas should be used.

Note.—It is suggested that the topics under "Organic Chemistry" be not treated more exhaustively than they are in such text-books as:

Alexander Smith's Chemistry.

An Elementary Study of Chemistry—Revised Edition—by McPherson and Henderson.

Elementary Principles of Chemistry, by Brownlee, Fuller, Hancock, Gohon, Whitsit.

Everyday Chemistry, by J. R. Partington.

BOTANY

Experimental Physiology.

Practical studies of osmosis, transpiration, photo-synthesis, respiration, geotropism, phototropism, regions of growth in stem and root.

Morphology and Physiology:

Plant Cells: study of a normal cell and a plasmolysed cell. Structure and general functions of the following plant organs: leaf, root, stem, flower, seed, fruit. Modification of roots, stems, and leaves for the special functions of storage and support. Light relations of leaves. Stipules, spines, tendrils and bud scales. Underground stems, comparison of roots and stems. Pollination and adaptations for cross-pollination. Fertilization, seed dispersal, vegetative reproduction as contrasted with sexual and spore reproduction. Study of typical seeds. Classification of fruits. A study by means of sections of the cellular structure of the leaf and of the relative arrangement of the more important tissues and tissue systems of the stem and root of bean and maize, or of any other typical dicotyledon and monocotyledon.

Cryptogams:

The practical study of representatives of the chief subdivisions of the cryptogams, spirogyra, a mushroom, a lichen, a liverwort, a moss, a horsetail, a club-moss and a fern. Distribution and economic importance of yeasts and bacteria. Microscopic structure of the yeast plant.

Recognition, mode of life, reproduction, economic importance and control of the following parasitic fungi: grain rust, loose smut of oats *or* corn smut, apple scab and black knot.

Spermatophytes:

The practical study of representatives of the seed plants of the locality, including at least one member of each of the following order: Pinaceæ, Gramineæ, Liliaceæ, Ranunculaceæ, Cruciferæ, Rosaceæ, Leguminosæ, Aceraceæ, Umbelliferæ, Labiatæ, Scrophulariaceæ, Compositæ.

Ecology:

Relation of the structure of plants to their environment as in mesophytes, hydrophytes, xerophytes.

Characteristics of these plant associations and a comparison of the ecological with the structural classification of plants.

Classification:

The placing of the types studied in their natural divisions: characteristics of these divisions.

Reference Books

Botany for High Schools. Cosens and Ivey.

Principles of Botany. Bergen and Davis.

Nature and Development of Plants. Curtis.

ZOOLOGY

Practical study of the external form of all types, and the dissection or the study of prepared specimens (or models), as specified below. Observational drawings are essential.

Mode of life of the various types. Reasons for including these types in their respective groups.

Protozoa:

Amoeba (or paramoecium): practical study of the living animal—habitat, movements, structure, functions and life history.

Mollusca:

Fresh-water clam: practical study of the living animal—habitat, habits, movements of shell, locomotion, action of siphons. Structure and markings of shells. Dissection to show mantle, foot, gills, muscles, digestive system, heart, cloaca. Life history.

Vermes:

Earthworm: practical study of the living animal—habitat, habits, external features, locomotion. Dissection to show internal organs. Study of a cross-section posterior to the gizzard. Mode of respiration.

Arthropoda:

Crayfish: practical study of the living animal—habitat, habits, locomotion. Segmentation and external features, including appendages and organs of respiration. Mode of respiration. Life history.

Grasshopper: practical study of living animal—habitat, habits, locomotion. Segmentation and external features, including appendages, mouth parts, wings and organs of respiration. Mode of respiration. Life history.

Comparison of the millipede, the spider, the grasshopper and the crayfish in the following points: (a) body divisions and segmentation, (b) mouth parts, (c) organs of locomotion.

A study of the cricket, May beetle, monarch butterfly, ant and mosquito, ladybird beetle, dragon-fly, berry bug, ichneumon fly as a basis for the classification of insects into the following orders: Orthoptera, Coleoptera, Odonata, Diptera, Lepidoptera, Hemiptera and Hymenoptera.

Chordata:

Pisces: practical study of a living fish, e.g., a perch or a gold fish—balancing, locomotion, respiration. External features, with special attention to adaptation to environment and habits. Organs of respiration, circulation, digestion, excretion. Swim-bladder.

Amphibia:

Practical study of a living frog—locomotion, breathing, circulation of blood through the web of the foot. Practical study of the external features and

skeleton. Dissection to show organs of respiration, circulation, digestion and excretion, and the central nervous system. Life history of a frog and a toad.

Reptilia:

Practical study of the external features, including mouth parts, of a snake and a turtle, with special reference to environment and to habits.

Aves:

Practical study of the external features, plumage and skeleton of some common bird. Adaptations to flight, with special reference to the form, skeleton, and organs of respiration. Digestion. Chief types of bills and feet.

Mammalia:

Practical study of (a) chief features of the skeleton, (b) organs of respiration, circulation, digestion and excretion, of a rabbit *or* a cat.

Comparison of the brain of a rabbit *or* a cat with that of a bird, and that of a frog.

Study of a mammalian eye from a specimen or from a model.

Note 1.—Except in the case of the clam, the earthworm, and the frog, where dissection is required, prepared specimens or models may be used. The cross-section of the earthworm should be studied with the low power microscope.

Note 2.—The order in which the above topics are to be studied should be determined by the supply of materials, the local conditions, etc.

Reference Books

Zoology for High Schools. Calvert and Cameron.
Zoology, Descriptive and Practical. Colton.
Textbook of General Zoology. Curtis.

LATIN AND GREEK

The courses of the Middle School in grammar and composition continued.

The Authors prescribed for the Upper School examination.

Sight work should form an important part of the course and should receive regular attention throughout the year.

In the study of Latin metres for the Upper School a knowledge of the following metres only will be required:

Hexameter, Elegiac, Alcaic, Sapphic.

FRENCH, GERMAN, SPANISH, ITALIAN

The courses of the Middle School in grammar and composition continued.

The authors prescribed for the Upper School examination.

Sight Work.

For details of the courses teachers should consult the Curriculum for Matriculation of the several Universities.

The requirements in Modern Languages for the Upper School Departmental examinations of 1937 and thereafter will be as follows:

(1) One prescribed text.

(2) The reading of an additional amount sufficient to make a total of 800 pages of French, and of 500 pages in each of German, Spanish, and Italian. This 800 pages (500 in the case of German, Spanish, and Italian) will include *all* texts read throughout the High School course.

(3) Each candidate for the examination will produce satisfactory proof by certificate from the Principal of the school that he has completed the above requirements.

(4) The candidate's knowledge of the language will be decided on the Authors paper by questions on the prescribed text and on unseen passages.

MIDDLE AND UPPER SCHOOL EXAMINATIONS

Notes.—(1) The machinery for the conduct of the Middle and Upper School examinations is provided by the Department of Education.

(2) The Universities and the Learned Societies select the papers that will meet their requirements for admission.

(3) On request, addressed to the Deputy Minister, the results of the Departmental examinations in which they are concerned are communicated by the Department to the Universities and the Learned Societies.

Examiners-in-Chief and Associate Examiners

1.—(1) The Examiners-in-Chief to set the question papers for the Middle, and Upper School examinations, and the Associate Examiners to value the answer papers of the candidates for Middle and Upper School examinations will be appointed by the Minister of Education.

(2) The Associate Examiners to value the answer papers of candidates for the Middle and Upper School Examinations shall be holders of Permanent High School certificates or of Permanent First Class certificates, who have had at least two years' experience in High or Continuation School work, and are actually engaged in teaching in the Normal, High, Continuation, or Vocational Schools.

(3) No Associate Examiner will be appointed to value the answer papers in a subject which he is not actually engaged in teaching.

(4) The valuation of the Middle and Upper School answer papers will be conducted at the Department under instructions from the Minister.

Examination Centres and Dates

2.—(1) Subject to the conditions hereinbefore contained and in accordance with a time-table to be issued by the Minister from time to time, written examinations, as defined below, in the subjects of the Middle and Upper School courses will be held annually by the Department of Education, at each High School and Collegiate Institute, and at such other centres as the Minister may

approve on the recommendation of the Public School Inspector or of the Senate of an Ontario university.

(2) The examinations at each local centre shall be conducted, and the cost thereof paid, under instructions from the Minister.

Examination Fees

3.—For the Annual Middle and Upper School examinations there will be no fees charged except that a fee of $1.00 will be imposed upon a candidate who has failed to make application for the examination before the first of May.

Application for Admission

4.—Application for admission to the Middle and Upper School examinations shall be made not later than the last day of April to the Principal of the school at which the candidate will write the examination, on an official form which may be obtained from the Principal or the Public School Inspector.

Official forms for reporting the lists of candidates for the different examinations will be sent to Principals.

Limitations of Admission

5.—An applicant may not be admitted to the examination in English Literature prescribed for the Middle or Upper School examination unless he complies with the following conditions:

(1) In the case of teachers who are actually and regularly engaged in teaching, the official form of application shall include a certificate, signed by the applicant, that he has read carefully during the preceding year, in addition to the works prescribed for the examination, at least four suitable works in English Literature, at least one of which shall be poetry, and the names of the books and the authors shall be given in said certificate.

(2) In the case of other applicants, the official form of application shall include a similar certificate signed by the Principal of the School in which the candidate has completed the course for said examination.

Papers

6.—(1) One question paper shall be set in each subject, except in the case of English, Agriculture and Horticulture, Household Science, and each of the following languages: Latin, Greek, French, German, Italian, Spanish. In each of these subjects there shall be two papers.

(2) Optional questions shall be given at all the examinations in History, and may be given in any other paper.

(3) In addition to the examinations on passages from the prescribed authors, questions on sight passages shall also be set at all the examinations in Greek, Latin, French, German, Italian, Spanish, and may also be set at the examination in English Literature.

(4) For each of the above examinations which includes English Literature as a subject, candidates will be expected to have memorized the prescribed

passages in the English Literature texts, and their knowledge thereof will be tested in the English Literature paper.

Valuation of Papers

7.—(1) Every paper shall be valued at 100 marks.

(2) At the Middle and Upper School examinations in English Literature and English Composition one mark shall be deducted for each error in spelling, but not more than ten marks shall be deducted for such errors on any one paper.

(3) If any question paper should be found to be longer, easier, or more difficult than required, due allowance may be made therefor.

Examination Report

8.—(1) Before the Middle and Upper School examinations begin a report on a form prescribed by the Minister shall be submitted from each school, signed by all the teachers concerned, giving the standing of their candidates. This report, if found satisfactory when tested, will be taken into account in settling the results.

(2) The names of all the candidates from the school shall be included in this report.

Appeals

9.—(1) The answer papers of all candidates at the Middle and Upper School examinations, who, on the valuation of the Associate Examiners, are found to have failed in any paper by not more than a small margin, shall be re-read before the settlement of the results.

(2) Subject to instructions from the Minister, candidates who fail at the Middle or Upper School examinations may have their papers re-read on lodging an appeal and paying a fee of $2.00 per paper.

(3) Candidates making appeals shall state where they wrote and the name of the examination attempted. *Principals sending in appeals in behalf of pupils shall make each appeal on a separate sheet of paper.*

(4) Should illness, bereavement, or any other unavoidable cause interfere with a candidate's examination, such circumstances shall be duly taken into account in settling the results, but only when fully reported to the Department with satisfactory documentary evidence, not later than the close of such examination.

SPECIAL PROVISIONS

MIDDLE AND UPPER SCHOOL EXAMINATIONS

10.—(1) Middle School standing will be granted to pupils in attendance at the day classes of any Collegiate Institute, High, Continuation, or Vocational School, and Upper School standing to pupils in attendance at the

day classes of any Collegiate Institute, High or Vocational School, under the following conditions:

(a) The qualifications of the teachers concerned and the provisions made for teaching the Middle or Upper School courses, as the case may be, shall be satisfactory to the Minister of Education.

(b) A pupil, to be granted standing in a paper, shall have completed the prescribed course therefor and in the judgment of the Principal and the teacher shall have obtained a standing on his year's work of at least 66 per cent.

(c) The Principal of the school and the teachers of the subjects concerned shall certify that the foregoing conditions have been fulfilled.

General Provisions and Directions

(2) In conformity with the above special provisions Principals and teachers as well as candidates will take note of the following general provisions and directions:

(a) At the end of April each candidate for Middle or Upper School standing shall fill out and submit his application as heretofore. If a candidate fails to make application before the first day of May he shall pay to the Presiding Officer a late fee of $1.00.

(b) The methods and procedure of preparing reports on the standing of candidates, as provided under section 8, page 39, of the High School Courses, are left to the discretion of the Principal and staff of each school.

(c) The Principal and staff of each school, on the Friday preceding the Departmental examinations, shall submit, on a form to be supplied by the Department, a report for the year on *all pupils* who are candidates for Middle or Upper School standing. In schools where there are two or more forms or classes or groups doing Middle School or Upper School work in a subject, each form or class or group shall be reported separately.

(d) On the Thursday of the week immediately preceding the Departmental examinations, the Principal shall notify each candidate of the paper or papers on which he has been given the standing of at least 66 per cent.

(e) There shall be no appeal to the Minister against the decision of the Principal and staff in the case of any candidate who has not been given at least 66 per cent. on a paper.

(f) The Middle and Upper School examinations will be conducted as heretofore, and all candidates for Departmental certificates, other than those who have been granted standing on the reports of their teachers, shall take the Departmental tests in the papers concerned.

(g) All Middle and Upper School certificates will indicate Credit and Proficiency standing as heretofore.

(h) (i) In schools in which there are prizes for Middle or Upper School candidates the awards may be made by the Principals and their staffs. (ii) Where scholarships or prizes are offered for competition among two

or more schools the competitors shall take the Departmental examinations. The universities and other bodies under which such scholarships and prizes are awarded shall submit the names of the candidates with other necessary information to the Department of Education.

EXAMINATION REQUIREMENTS

Standards

11.—(1) Candidates may write on one or more papers at a time and in any order. On obtaining 50 per cent. of the marks assigned to any paper they will be given credit for having passed in such paper and will receive a certificate of such standing.

(a) At the Middle School examination certificates will be issued showing the standing obtained on each paper, as follows: First grade proficiency, 75 per cent.; Second grade proficiency, 66 per cent.; Third grade proficiency, 60 per cent.; and Credit, 50 per cent.

(b) At the Upper School examination the certificates will show standing as in the case of the Middle School examination. The certificates will also show honour standing by departments according to the standards set for Honour Matriculation; First Class, 75 per cent.; Second Class, 66 per cent.; and Third Class, 60 per cent.

Note.—Proficiency standing will not be indicated on Lower School certificates.

(c) (i) Forty per cent. on a paper in any one of the following Upper School subjects will be accepted in lieu of credit for the corresponding Middle School paper: English (Literature and Composition), Algebra, Geometry, Chemistry, and the languages.

(ii) Forty per cent. in the Upper School paper in Botany or Zoology will be accepted in lieu of credit for the corresponding Lower School paper.

(iii) Forty per cent. or Credit standing on the Upper School paper in Modern History will be accepted in lieu of Credit for Middle School Canadian History, provided a candidate has a certificate for Lower School standing in Canadian History.

(2) These certificates of credit will be accepted pro tanto for admission to the Normal Schools and to the Universities and Colleges. Special certificates for this purpose are unnecessary.

12.—Candidates for entrance into the Normal School courses leading to First or Second Class certificates, or for Matriculation into a University, are entitled to credit for each paper on which they obtain at least 50 per cent. at any former Departmental Lower School, Model Entrance, Middle School, or Upper School examination.

13.—Candidates who have credit for one or more papers of the former Upper School Honour Matriculation examination may complete their standing by passing in the additional papers which they require under the present Regulations. Under this provision, credit for History (Second Course) is

accepted as credit for Modern World History. Credit for History (First Course) is not so accepted.

14.—Candidates who in any year prior to 1920 wrote on the examinations conducted by the University Matriculation Board, and who wish to qualify for entrance into the Normal School courses leading to First Class certificates, are entitled to credit for each paper on which they obtained at least 50 per cent.

Requirements for Matriculation

15.—(1) The subjects of the Middle School required for Pass Matriculation are the following: English (Literature and Composition), Canadian History, Ancient History (or Music), Algebra, Geometry, Latin.

Two of: Greek, French, German, Spanish *or* Italian, Science (Physics, or Agriculture, Part I; Chemistry, or Agriculture, Part II).

Note.—A Junior certificate issued by the Toronto Conservatory of Music in History and Harmony or in any practical subject other than sight-singing, together with the required Theory, will be accepted in lieu of the Middle School certificate in Music.

(2) Candidates who prior to 1929 passed the examination in either Part I or Part II of the Middle School Agriculture and Horticulture course may complete the science requirements of the Middle School by passing the examination in one of the following courses as outlined in the High School Courses of Study, 1928:

(a) Agriculture and Horticulture, Part I.

(b) Agriculture and Horticulture, Part II.

(c) Physics.

(d) Chemistry.

(3) There is no special examination known as Honour Matriculation or Senior Matriculation; but Proficiency standing may be granted on all Pass papers, and Honour standing may be granted in English (Literature, Composition), History, Mathematics (Algebra, Geometry, and Trigonometry), Latin, Greek, French, German, Spanish, Italian, Biology (Botany and Zoology), Physics, Chemistry.

(4) Honours are not granted on papers, but on the combination of papers set in a subject, e.g., English, Mathematics, Latin, etc.

(5) The standing for honours is a minimum of 50 per cent. on each paper, with an average of 60 per cent. in the papers of each subject.

Note 1.—The requirements for admission to University Honour courses are to be found in the Matriculation Calendars of the Universities.

Note 2.—It should be noted that although Upper School History is not an obligatory subject for Matriculation it is obligatory for admission to the Normal School course for Interim First Class certificates.

GRADUATION DIPLOMAS

16.—(1) On application of the Principal, a Graduation Diploma will be granted to every pupil whose conduct has been satisfactory and who fulfils the following conditions:

(a) The pupil shall complete satisfactorily at least twelve subjects selected by the Principal and approved by the Minister as suitable to the pupil and to the organization of his school.

(b) The twelve subjects shall include:

(i) Lower School British History,
(ii) Lower School Physiography,
(iii) Middle or Upper School English,
(iv) Middle School Canadian History,
(v) At least five of the other optional subjects of the Middle *or* Upper School as stated in Sections 2 and 3 of pages 8 and 9 of the High School Courses of Study.

(2) A subject (e.g., Algebra, Chemistry, Latin, etc.) cannot be accepted from more than one of the Lower, Middle, or Upper School courses.

(3) Where a language is selected the pupil shall complete the courses in both Authors and Composition in the Middle School *or* in the Upper School.

(4) A pupil who has been awarded a Graduation Diploma, and who later completes satisfactorily the courses in additional subjects may, on application to the Principal, have such additional subjects recorded on his Graduation Diploma.